

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
14 October 2004 (14.10.2004)

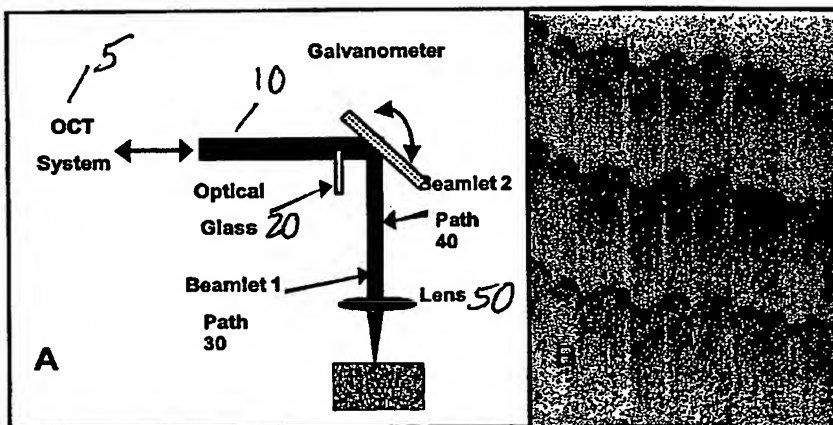
PCT

(10) International Publication Number  
**WO 2004/088361 A3**

- (51) International Patent Classification<sup>7</sup>: **G01B 9/02**
- (21) International Application Number:  
PCT/US2004/010152
- (22) International Filing Date: 31 March 2004 (31.03.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/459,543 31 March 2003 (31.03.2003) US  
60/476,600 6 June 2003 (06.06.2003) US  
60/514,769 27 October 2003 (27.10.2003) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report

[Continued on next page]

(54) Title: **SPECKLE REDUCTION IN OPTICAL COHERENCE TOMOGRAPHY BY PATH LENGTH ENCODED ANGULAR COMPOUNDING**



(57) Abstract: Speckle, a factor reducing image quality in optical coherence tomography ("OCT"), can limit the ability to identify cellular structures that are important for the diagnosis of a variety of diseases. The present invention allows for an implementation of an angular compounding, angular compounding by path length encoding ("ACPE") for reducing speckle in OCT images. By averaging images obtained at different incident angles, with each image encoded by path length, ACPE maintains high-speed image acquisition and implements minimal modifications to OCT probe optics. ACPE images obtained from tissue phantoms and human skin in vivo demonstrate a qualitative improvement over traditional OCT and an increased signal-to-noise ratio ("SNR"). Accordingly, apparatus probe catheter, and method are provided for irradiating a sample. In particular, an interferometer (5) may forward forwarding an electromagnetic radiation (10). In addition, a sample arm may receive the electromagnetic radiation, and can include an arrangement (20) which facilitates a production of at least two radiations (30, 40) from the electromagnetic radiation so as to irradiate the sample. Such arrangement can be configured to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations.



**(88) Date of publication of the international search report:**  
7 April 2005

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10152

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01B 9/02

US CL : 356/479

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 356/479, 497

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- A	WO 01/33820 A1 (HAAG-STREIT AG) 31 May 2001(31.5.2001), see figure 4.	1, 11-13, 21-23, 25, 26 ----- 2-10, 14-20-, 24

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

29 October 2004 (29.10.2004)

Date of mailing of the international search report

20 DEC 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

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